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CABBAGE-SEED TREATMENT.

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WHY SEED TREATMENT IS GOOD INSURANCE.

THE TOLL OF LOSSES due to two seed-borne diseases of cabbage—black-leg and black-rot—is a heavy one each year. Most cabbage seed is grown at points remote from the place where it is used. It having passed through several hands meantime, little or nothing is ordinarily known by the planter as to the prevalence of disease on the plants from which the seed was secured. Unfortunately, there is no practicable method of determining offhand whether or not a given sample of seed is infected. To the careful grower who realizes that the germs can be eradicated from the seed before planting by very simple, cheap, and effective methods, seed treatment becomes a very essential and low-priced insurance.

DANGEROUS DISEASES WHICH ARE SEED BORNE.[1]

BLACK-LEG.

Black-leg (fig.1) appears on the leaves, stems, and seed pods as roughly circular ashen-gray spots in which are embedded numerous

[1] Harter, L. L., and Jones, L. R. Cabbage diseases. U. S. Dept. Agr., Farmers' Bul. 1351, 28 p., 14 fig. 1923.

small black dots much smaller than a pinhead, but plainly visible to the naked eye. The most destructive feature of the disease is occasioned by infection on the lower portion of the stem and on the roots. The fine roots of the plant are eventually destroyed, and the lower portion of the stem is girdled, leaving a blackened and decayed stem and taproot. From this symptom the name "black-leg" is derived. In this advanced stage the plant often wilts suddenly, the leaves in such cases always clinging to the main stem.

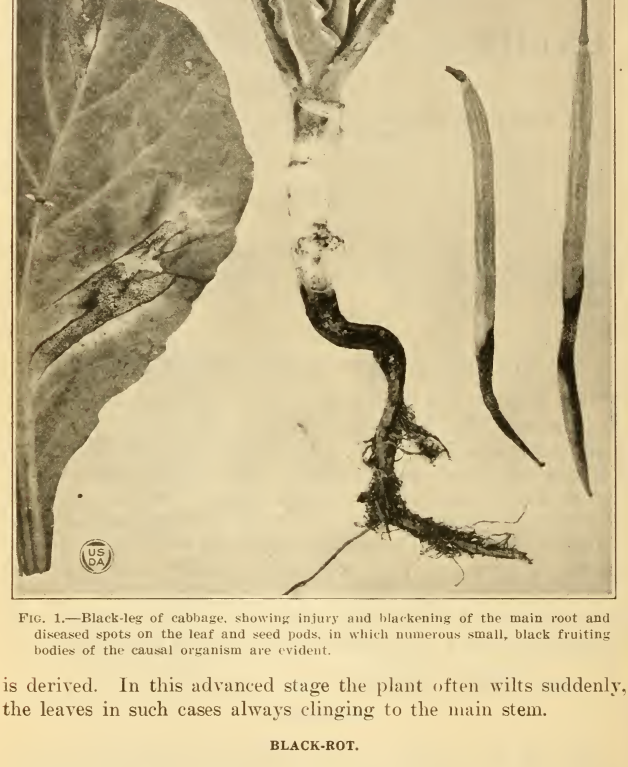

FIG. 1.—Black-leg of cabbage, showing injury and blackening of the main root and diseased spots on the leaf and seed pods, in which numerous small, black fruiting bodies of the causal organism are evident.

BLACK-ROT.

Black-rot (fig. 2) develops first as yellow blotches at the leaf margins or at insect wounds. Decided blackening of all the fine veins within that area occurs, and the disease can be traced from there through the plant by the blackening of veins in the leaf

petioles and the main stem. In later stages one-sided development of leaves or of the entire plant is common, due to the localization of infection in the vessels of one side of the leaf petiole or stem. Common soft-rot, due to another organism, almost invariably follows black-rot in its later stages.

SEED-BED SANITATION NECESSARY.

Since the germs of both black-leg and black-rot may live over winter in diseased trash, it is obvious that care must also be taken to avoid this source of infection. Where hotbeds or cold-frames are used from year to year for growing cabbage seedlings, clean soil should be used each year or the soil should be steam sterilized. For directions for steam sterilization, see Farmers' Bulletin No. 996. When seed beds are planted in the open, judicious rotation should be practiced. Where either of these diseases has occurred previously, the soil should not be used for the cabbage seed bed for at least three years unless sterilized.

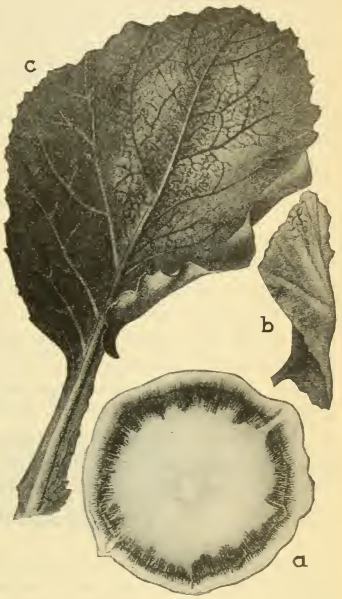

FIG. 2.—Black-rot: *a*, Section through a cabbage stem, showing the conspicuous ring of black bundles caused by the black-rot organism; *b*, infection through the veins at the margin of a leaf; *c*, a cabbage leaf, showing the blackening of the veins as a result of the invasion of the black-rot organism.

HOW TO TREAT CABBAGE SEED.

MERITS OF THE TWO METHODS.

Mercuric-chlorid seed treatment is by far the simpler of the two treatments recommended. There is practically no injury to the seed. Its only limitation—and this is often a serious one—is that the black-leg fungus, though greatly reduced, is not entirely killed, although black-rot is almost completely controlled. When seed is known to be entirely free from black-leg this method is adequate. When seed is known to be infested with black-leg or its conditions as to infection are unknown, the hot-water treatment may be used. It will completely control black-leg, but will reduce somewhat the percentage of germination. This reduction in

the case of new, plump seed is negligible, but with old or badly shriveled seed it may be considerable. The hot-water treatment should therefore be used cautiously, and preliminary trials should preferably be made to determine its effect on the germination of a given lot.

The directions given herewith are considered the most convenient for the average grower who treats seed in quantities of 5 pounds or less. It is obvious where larger quantities are to be treated that the details of operation must be varied according to circumstances. In any modification, however, thorough wetting of the seed is always necessary, and in the case of the hot-water treatment constant agitation and uniform temperature should be maintained. Prompt and thorough drying after treatment is essential, especially if the seed is to be resacked, and it can be done most simply by spreading the seed out in shallow layers where there is free air circulation and turning it several times until thoroughly dry, two or three days later.

MERCURIC-CHLORID TREATMENT.

Mercuric chlorid (corrosive sublimate) may be procured from any drug store in readily soluble tablet form. Following directions on the package, make up a 1 to 1,000 solution, avoiding metal containers. Place the seed on the center of a square piece of coarse cheesecloth of such size that when the edges are drawn together and tied the improvised sack is not more than one-third full. Immerse in the disinfectant, agitating the seed vigorously so as to remove the air and thoroughly wet the seed coats. Soak for 30 minutes. Remove, rinse in clean water, and allow to drain several minutes. Open the sack on a table top, spreading the cloth out flat. Spread the seed over the cloth in a shallow layer to facilitate rapid drying.

HOT-WATER TREATMENT.

Prepare the seed in a cheesecloth sack as described above. Provide a large vessel containing water adjusted to exactly 122° F., a reliable thermometer, and a stirring rod. Immerse the seed bag, agitating the seed thoroughly and stirring the water slowly. Keep the water temperature approximately constant by adding steam or boiling water whenever the thermometer registers below 122° F. Remove the seed bag for an instant as the water or steam is added. Soak for 30 minutes. Remove to cold water, drain, and spread out to dry as described above.

Try the hot-water treatment on a small sample of the seed and run a germination test to determine the percentage of injury before treating the entire lot.

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